ORDER

6850.30

RUNWAY END IDENTIFIER LIGHTING SYSTEM (REIL)
WITH REMOTE MONITORING SUBSYSTEM (RMS)
PROJECT IMPLEMENTATION PLAN

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Distribution: A-W (PS/SM/LG/VN/SE)-3; A-W(FS/TR/TO)-2
A-X (AF/AS/AT/FS)-3; A-FAF-2/7 (LTD)
A-Y(DE/AY)-3; A-Z-1; ASM-400 (4), ASM-600 (4)

Initiated By: APS-450

FOREWORD

This project implementation plan (PIP) provides management direction for the implementation and acceptance of the Runway End Identifier Lighting System (REIL) with Remote Monitoring Subsystem (RMS) into the National Airspace System (NAS). It defines the major functional responsibility levels, management direction, and overall program guidance to all responsible levels within the Federal Aviation Administration (FAA) for the procurement and implementation of the REIL with RMS.

Robert E. Brown
Director, Program Engineering Division

TABLE OF CONTENTS

		Page No.
CHAPTER 1. GENERAL		
1.	Purpose	1
2.	Distribution	1
3.	Action	1
4.-19.	Reserved	
CHAPTER 2. PROJECT OVERVIEW		
20.	Synopsis	3
21.	Purpose	3
22.	History	3
23.-29.	Reserved	
CHAPTER 3. PROJECT DESCRIPTION		
30.	Functional Description	5
31.	Physical Description	10
32.	System Requirements	11
33.	Interfaces	16
34.-39.	Reserved	
CHAPTER 4. PROJECT SCHEDULE AND STATUS		
40.	Project Schedules and General Status	19
41.	Milestone Summary Schedule	19
42.	Interdependencies and Sequence	20
43.-49.	Reserved	
CHAPTER 5. PROJECT MANAGEMENT		
50.	Project Management, General	21
51.	Project Contacts	22
52.	Project Coordination	23
53.	Project Responsibility Matrix	28
54.	Project Managerial Communications	29
55.	Implementation Staffing	29
56.	Planning and Reports	29
57.	Applicable Documents	29
58.-59.	Reserved	

Page No.

CHAPTER 6. PROJECT FUNDING

60. Project Funding Status, General 31
61.-69. Reserved

CHAPTER 7. DEPLOYMENT

70. General Deployment Aspects 33
71. Site Preparation 33
72. Delivery 33
73. Installation Plan 34
74. Configuration Management Plan 34
75.-79. Reserved

CHAPTER 8. VERIFICATION

80. Factory Verification 37
81. Checkout 37
82. Contractor Integration Testing 37
83. Contractor Acceptance Inspection (CAI) 37
84. FAA Integration Testing 37
85. Shakedown and Changeover 37
86. Joint Acceptance Inspection 38
87.-89. Reserved

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. Maintenance Concept 39
91. Training 39
92. Support Tools and Test Equipment 39
93. Supply Support 40
94. Vendor Data and Technical Manuals 40
95. Equipment Removal 40
96. Facilities 40
97. Equipment Not Furnished 40
98.-99. Reserved

Page No.

LIST OF FIGURES

FIG. 3-1 REIL System Block Diagram 6

FIG. 3-2 REIL Configuration 13

FIG. 5-1 Project Responsibility Matrix 28

LIST OF TABLES

TABLE 3-1 Control Switches 7

TABLE 3-2 REIL Performance Parameters 9

TABLE 3-3 Runway Lighting Circuit Loop Currents and Identifier Intensity Levels 14

TABLE 3-4 REIL With RMS Equipment Reliability 15

TABLE 3-5 REIL With RMS Equipment Maintainability 15

TABLE 4-1 REIL With RMS Schedule 19

TABLE 7-1 REIL With RMS (FY 87/88) DRR Schedule 33

CHAPTER 1. GENERAL

1. PURPOSE. This project implementation plan (PIP) provides technical guidance and direction for implementing the Runway End Identifier Lighting System (REIL) with Remote Monitoring Subsystem (RMS) into the National Airspace System (NAS).

2. DISTRIBUTION. This order is distributed to branch level in the Program Engineering, Systems Maintenance, Logistics Services; Aviation Standards National Field Office, Office of Airport Standards, and Office of System Engineering and Program Management; to division level in the Offices of Flight Standards, Air Traffic Operations, and Air Traffic Plans and Requirements; to branch level in the regional Airway Facilities, Airports, Air Traffic, and Flight Standards divisions; to the Directors, FAA Technical Center and Mike Monroney Aeronautical Center; and to the Airway Facilities sectors, sector field offices, sector field units, and sector field office units.

3. AUTHORITY TO CHANGE THIS ORDER. The Director, Program Engineering Service shall approve all changes to this order.

4.-19. RESERVED.

CHAPTER 2. PROJECT OVERVIEW

20. SYNOPSIS. The REIL with RMS program consists of procuring equipment specified in FAA-E-2159d, Runway End Identifier Lighting System (REIL) with Remote Monitoring Subsystem (RMS), and installing and integrating the system as part of a visual aids establishment program.

21. PURPOSE. The primary function of the REIL with RMS is to provide the pilot rapid and positive identification of the approach end of a runway. The remote maintenance monitoring subsystem performs a secondary function of providing maintenance monitoring for the REIL.

22. HISTORY.

a. The present REIL population is comprised of several generations of REIL equipment, none of which have a remote maintenance monitoring capability. Because no RMM capability was available on these older systems, equipment degradation sometimes went unnoticed until the equipment failed. The decision to provide RMM for the REIL system attempts to solve this problem by making failures of REIL equipment more predictable. By MANAGING these failures, it is anticipated that maintenance visits can be both reduced in frequency and scheduled with other visits. Availability of the REIL system is also anticipated to improve since failures are reported by the RMS on a real-time basis and problems are often corrected before the system fails. Note, at the present time, there are no plans to retrofit the non-RMS equipped REILS with RMS capability.

b. On June 9, 1988, an 8A contractor, DME Corporation of Ft Lauderdale, Florida was selected to design, produce, test, and provide engineering support for a new REIL system with RMS.

23.-29. RESERVED.

CHAPTER 3. PROJECT DESCRIPTION

30. FUNCTIONAL DESCRIPTION. The basic function of the REIL with RMS will be to provide the pilot with a rapid and positive identification of the approach end of the runway. A secondary function, maintenance monitoring, is accomplished by the remote monitoring subsystem. The REIL system (Figure 3-1, REIL System Block Diagram) will consist of two flashing light units with self-contained power supply and control. The two synchronized flashing lights, either directional or omnidirectional, will be placed one on each side of the runway landing threshold. If directional lights are used, they must face the approach area. The flashing feature of the lights is intended to attract the attention of the pilot so that he may quickly identify the approach end of the runway, especially when surrounded by a preponderance of other lighting or when contrast in surrounding terrain is lacking. lighting control will be available from the tower control computer complex (TCCC) at those airport traffic control towers (ATCT) so equipped. At non-TCCC ATCTs, control may be provided via the Remote Radio Control System (RRCS), runway edge light circuitry, a switch in the control cabinet or, if the airport is unmanned, via VHF/UHF radio from an aircraft.

a. Control Cabinet. The control cabinet accepts the 120/240 VAC input power required to operate the REIL with RMS. The control cabinet then provides 120/240 VAC, three-wire, 60 Hz power and control signals to the individual control cabinets to control intensity step changes and to simultaneously trigger the identifier units. As part of the control circuitry the control cabinet contains two control switches which are used to energize/de-energize the identifier units and to permit automatic, manual and remote control operation of them as indicated in Table 3-1, Control Switches. In addition to these functions, the control cabinet also contains circuitry to detect the presence of identifier unit misfires when they exceed a thumbwheel set threshold and to route this information to the remote monitoring subsystem. The control cabinet also houses the remote monitoring subsystem and interfaces the REIL system with the remote control circuitry.

b. Identifier Assemblies. The identifier assemblies contain the flash tubes used to indicate the approach end of the runway to the pilot. These flash tubes are triggered by a triggering circuit energized from the control cabinet at an interval of twice a second. The identifier assembly also contains a current detection device which is used to monitor the operation of the flash tube.

c. Aiming Device. The aiming device is an accessory that permits field aiming of the lamp axis perpendicular to the plane of the cover glass to any angle from 0 to + 25 degrees above the horizontal. The final aimed angle of the lamp with the device unattached shall be accurate within one degree of the actual angle.

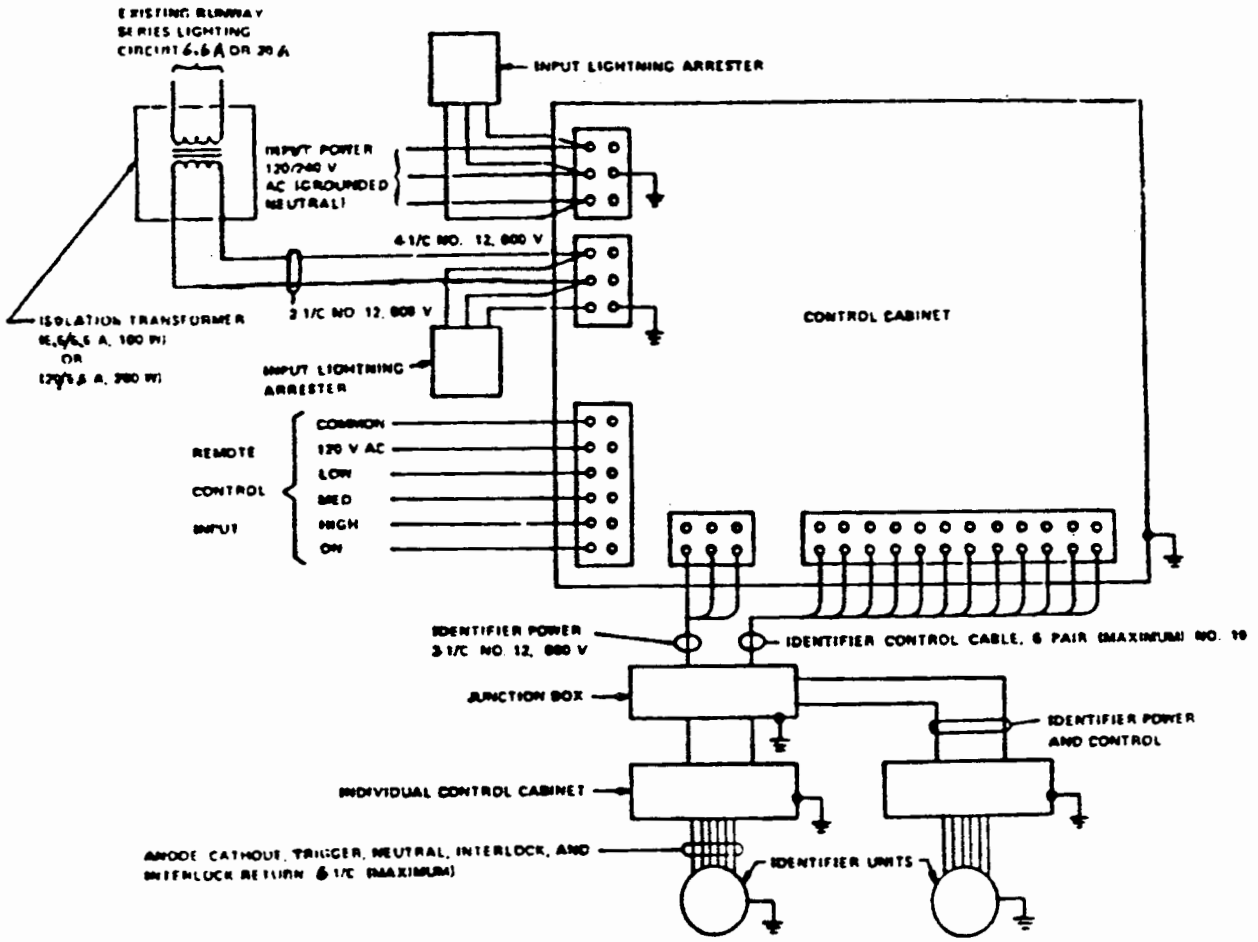

FIGURE 3-1. REIL SYSTEM BLOCK DIAGRAM

SWITCH POSITION	FUNCTION
Switch 1 (Identifiers)	
ON	Identifier units are energized.
OFF	Identifier unit are de-energized.
Switch 2	
REMOTE	Identifier units remotely controlled.
AUTO	Identifier units operate automatically in conjunction with runway lighting circuit.
LOW	Identifier units operate on low intensity
MEDIUM	Identifier units operate on medium intensity.
HIGH	Identifier units operate on high intensity.

TABLE 3-1. CONTROL SWITCHES

d. Remote Monitoring Subsystem. The primary function of the RMS is to remotely monitor the performance parameters of the REIL equipment, pre-process the monitored signals from the current sensors and REIL control cabinet, and to transmit the digitized data to a centralized link control unit (LCU). Table 3-2, REIL Performance Parameters, shows those parameters which are remotely monitored. In addition, the REIL RMS exercises control over the REIL equipment upon receipt of a command from the LCU, and provides a terminal interface for use with a portable terminal. The REIL with RMS also provides a remote maintenance monitoring capability for an air-to-ground (A/G) receiver (RC 1T5A, manufactured by Control Industries, Urbana, Ohio, or equivalent) through an optional modification kit.

e. Link Control Unit. The link control unit acts as a central point of communication and manages all communication (1) between the maintenance processor subsystem (MPS) and equipment RMS, (2) between the MPS and the link control unit's terminal interface, and (3) between the link control unit's terminal interface and the equipment RMS. The link control unit acts as a complex station, performing as a secondary station on the MPS interface, and as a primary station on the LCU to equipment RMS multi-point data link. The link control unit power supply provides DC operating voltages for all functions within the LCU, and also provides a +9 to +12 VDC (15 watt) power source for radio link operations.

For safety purposes, the MPS remote control commands, through the LCU, are limited to increasing intensity steps.

Parameters	Normal	Alarm
Control cabinet input voltage	228 - 252 VAC (240 VAC nominal)	Less than 228 VAC more than 252 VAC
Control cabinet output voltage	228 - 252 VAC (240 VAC nominal)	Less than 228 VAC more than 252 VAC
Identifier units Status	Both flashers on	1 flasher out
Identifier misfires	1 to 7 over a 100-trigger sample interval	More than 7 over a 100-trigger sample interval
Flashing rate	120 ± 2 flashes per minute	Less than 118 flashes per minute. More than 122 flashes per minute.
Intensity Setting 1 Low 2 Medium 3 High		
Control cabinet power supply voltage(s)	To be determined by the contractor	To be determined by the contractor
A/G receiver	Operational	Not operational

TABLE 3-2. REIL PERFORMANCE PARAMETERS

31. PHYSICAL DESCRIPTION.

a. Control Cabinet. The REIL control cabinet is an outdoor NEMA Type 4 enclosure of sufficient size to contain the power and control circuitry and the RMS for the REIL system. The cabinet housing is rigidly constructed and will not distort or bend under normal methods of shipping, handling, installation, or maintenance. The cabinet housing has been equipped with a hinged door with provisions for padlocking and has adequate internal clearance to facilitate installation and maintenance of components. A metal panel has been installed in the rear of the cabinet upon which all components will be installed. Space shall be reserved for field installation of conduits for all external cable connections. A trouble light and convenience outlet (of ground fault circuit interrupt type) shall be included for maintenance personnel.

b. Identifier Assemblies. Each identifier assembly consists of an individual control cabinet (interlock switches are included) and a flasher light unit (identifier unit).

(1) The individual control cabinet is an outdoor, liquid tight, dust tight, non-ventilated enclosure. The cabinet is rigidly constructed and will not distort or bend under normal methods of shipping, handling, and installation. The cabinet is of sufficient size to accommodate all the necessary components and wiring and to provide adequate clearance for field installation and maintenance. It will have mounting means external to the cabinet cavity, and means for locking. Terminal blocks have been located near the cable entrance to permit termination of all external power and control wires feeding into the cabinet. Lightning arresters to protect input and output power terminals, as well as input and output control signal terminals are also provided.

(2) The identifier unit housing shall be constructed of stainless steel or aluminum, or of a nonferrous material comparable in service life. All components in the identifier unit shall be accessible through a door or cover for maintenance purposes. Cable fitting are designed such that they provide both a waterproof and strain relief connection to the housing. Each identifier unit shall be assembled to a mounting base. The mounting base shall have an internal wireway for six wires to the lamp holder. The mounting base permits rigid mounting of the complete identifier unit by either capping the open top of a frangible coupling or by capping the open top of a 2-inch electrical metallic tubing conduit attached to a frangible coupling. The identifier unit flash tube, in accordance with

current standards, shall have a rated life of at least 1,000 hours when operated on the high intensity step and the effective intensity shall not decrease more than 30 percent during the minimum rated life. The lamp socket shall be a plug-in type porcelain socket with screw terminals for required wire terminations. The socket shall be attached to the lamp housing with screws to facilitate easy removal or replacement of the socket. The identifier units shall also permit the mounting of baffles that will minimize or eliminate the blinding effects of the lights.

c. Aiming Device. The aiming device shall fit over the cover glass of the lamp and be held firmly in place by a pressure plate with adjustable spring tension. The aiming angle shall be indicated on a scale calibrated in one degree intervals.

d. Remote Monitoring Subsystem. The REIL RMS consists of current sensors, cabling, connectors, the mounting hardware necessary to route REIL RMS and a data acquisition system. The data acquisition system consists of a DC power supply, a terminal interface for use with a portable terminal, a VME bus interface card cage and provisions for interface with a government furnished radio link for communication with a link control unit.

e. Link Control Unit. The link control unit consists of a DC power supply, a government furnished radio operating in the UHF band, a VME bus interface card cage and three data links. The three data links consist of a maintenance processor subsystem interface, the LCU to equipment RMS multi-point data link, and the terminal interface. The LCU is designed such that the capability of interfacing the LCU with up to 10 systems with RMS can be expanded with the installation of an expansion kit, when installed, this expands the LCU capability such that the LCU has the capacity for interfacing with up to 20 systems with RMS. The LCU is compatible with other navigational aids, i.e. medium intensity approach lighting systems with/runway alignment indicator lights (MALSR), precision approach path indicator (PAPI), instrument landing system (ILS), etc.

32. SYSTEM REQUIREMENTS. REIL with RMS requirements include power, siting, operational, electromagnetic interference, and environmental considerations. Reliability, maintainability, accessibility, and interchangeability are also design considerations of the system.

a. Power. The runway end identifier lighting system operates on a single phase, 60 Hz, 120/240 VAC grounded-neutral, constant potential commercial power source. The REIL RMS power supply uses

this AC power source to provide the DC voltage needed to operate the REIL RMS, and to provide a trickle charge to batteries for backup when AC power is unavailable. Power requirements for the LCU must be between 23.0 and 27.0 VDC only. The link control unit also has a one hour battery backup as a secondary power source. Other power requirements for the REIL are outlined in FAA Order 6950.2C, Electrical Power Policy Implementation National Airspace System Facilities.

b. Siting. The REIL light unit shall be located as shown in Figure 3-2, REIL Configuration. The optimum location is 40 feet from the runway edge and in line with the existing runway threshold lights. The light units may be located laterally up to 75 feet from the runway edge and longitudinally 30 feet downwind and 100 feet upwind from the line of threshold lights. These location tolerances should be employed as required to keep the light units a minimum distance of 40 feet from other runways or taxiways. The light units shall be located as nearly equidistant from the runway centerline as practicable with the difference in the distance of the two lights to the centerline not exceeding 10 feet. The elevation of both units shall be within 3 feet of a horizontal plane through the runway centerline. When a REIL is installed on the same runway as a visual approach slope indicator (VASI), the REIL light units shall be located 75 feet from the runway edge. Additional siting criteria are found in FAA Order 6850.2A, Visual Guidance Lighting Systems. Standard installation drawings will also provide guidance for location of standard A/G receiver, ground-to-ground (G/G) receivers, G/G decoders, and interface cabinets.

c. Operational. The REIL system at certain locations may be required to be controlled by the runway edge lights or from remote control circuitry. The following operational requirements must be considered for these systems to interface properly.

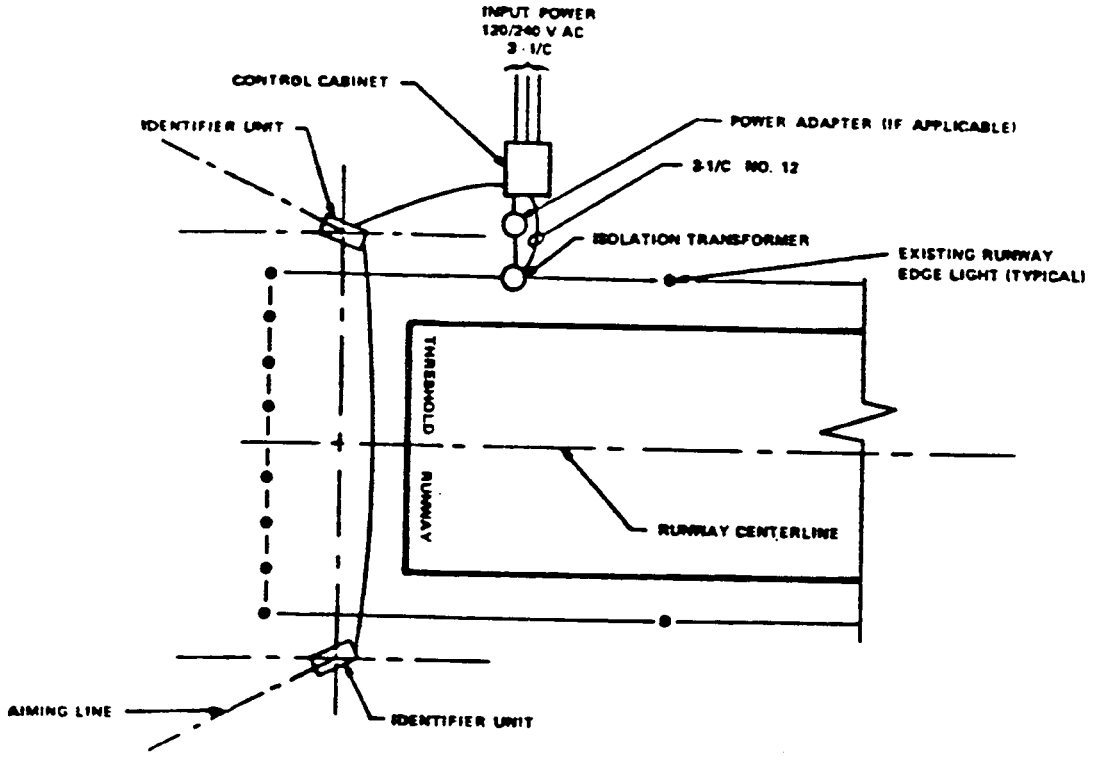

FIGURE 3-2. REIL CONFIGURATION

(1) In the AUTO mode, the identifier units operate in conjunction with the runway edge lighting circuit that is a series circuit, powered by a constant current regulator. This series circuit may be either a high intensity runway light (HIRL) circuit having five different current steps or a medium intensity runway light (MIRL) circuit having three different current steps. Operation of the identifier units in the auto mode is accomplished by sensing the current in the runway edge lighting circuit. It is therefore imperative that the runway lighting circuit loop current effect on identifier intensity levels be taken into consideration before deciding to implement this option. Table 3-3, Runway Lighting Circuit Loop Currents and Identifier Intensity Levels, describes the parameters under which the REIL system will correctly function.

Runway Lighting Circuits	Loop Current (Amperes)	Identifier Intensity Levels
MIRL	6.6 ±3%	High Intensity
	5.5 ±3%	Medium Intensity
	4.8 ±3%	Low Intensity
HIRL (6.6 Ampere Circuit)	6.6 ±3%	High Intensity
	5.2 ±3%	High Intensity
	4.1 ±3%	Medium Intensity
	3.4 ±3%	Low Intensity
	2.8 ±3%	Low Intensity
HIRL (20 Ampere Circuit)	20.0 ±3%	High Intensity
	15.8 ±3%	High Intensity
	12.8 ±3%	Medium Intensity
	10.3 ±3%	Low Intensity
	8.5 ±3%	Low Intensity

TABLE 3-3. RUNWAY LIGHTING CIRCUIT LOOP CURRENTS AND IDENTIFIER INTENSITY LEVELS

(2) In the REMOTE mode the REIL system is controlled by remote control input signals {120 VAC, 500 mA (maximum)} to the control cabinet. The REIL control cabinet provides the power source for the remote control input signals, and an interface device. The remote control interface device described in FAA-E-2663, MALSR Remote Control Interface Unit, provides the contact closures required to energize the identifier units.

d. Electromagnetic Interference. Conducted interference levels on incoming ac power leads, control leads, signal leads, and interconnecting cables between parts shall not exceed the limits for CE03 as defined in MIL-STD-461 (equipment class ID). Similarly, radiated narrow band and broadband interference levels shall not exceed the limits for RE02 of MIL-STD-461 over the frequency range from 14 kHz to 400 MHz at a distance of 20 feet (6.1 meters).

e. Reliability. REIL with RMS equipment reliability criteria are depicted in Table 3-4, REIL With RMS Equipment Reliability.

EQUIPMENT	MEAN TIME BETWEEN FAILURES (MTBF)
Control Cabinet	2,500 hours
Individual Control Cabinet	2,500 hours
RMS	30,000 hours
Link Control Unit	30,000 hours

TABLE 3-4. REIL WITH RMS EQUIPMENT RELIABILITY

f. Maintainability. REIL with RMS equipment maintainability criteria are depicted in Table 3-5, REIL With RMS Equipment Maintainability.

EQUIPMENT	MEAN TIME to Repair (MTTR)	Maximum Repair Time
Control Cabinet	0.5 hour	6 hours
Individual Control Cabinet	0.5 hour	4 hours
RMS	0.5 hour	4 hours
Link Control Unit	0.5 hour	4 hours

TABLE 3-5. REIL With RMS EQUIPMENT MAINTAINABILITY

g. Environmental. The REIL with RMS is designed for continuous or intermittent operation under the following environmental conditions:

(1) Temperature. Ambient temperature between -55 and +65 degrees Centigrade (-67 and 149 degrees Fahrenheit).

(2) Altitude. Sea level to 10,000 feet (3,048 meters) mean sea level (msl).

(3) Humidity. Up to 100 percent relative humidity from sea level to 10,000 feet (3,048) msl and at +70 degrees Centigrade ambient temperature.

(4) Sand and Dust. Exposure to wind-blown sand and dust particles as may be encountered in arid conditions.

(5) Salt Spray. Exposure to salt-laden atmosphere with relative humidity of up to 95 percent.

(6) Rain. Exposure to wind blown rain.

(7) Solar Radiation. Exposure to sunshine with ambient temperatures of -55 to +70 degrees Centigrade.

(8) Temperature Shock. Exposure of external surfaces including light windows to a sudden application of cold water when the lights reach stable operating temperatures.

(9) Vibration. Vibrations in the frequency range of 10 to 2,000 Hertz.

h. Accessibility. The REIL with RMS is designed for optimum accessibility, operating compatibility, and maintenance. Each article of equipment and each major subassembly provides the required access to interior parts, terminals, and wiring for adjustments, circuit checks, and the removal and replacement of maintenance parts.

i. Interchangeability. All parts of the unit furnished under a single procurement will be manufactured to a tolerance that permit interchangeability of any part with a like part of any other unit.

33. INTERFACES. The REIL with RMS has the capability of being monitored by the remote maintenance monitoring system (RMMS) described in FAA-E-2782, Remote Maintenance Monitoring System, Core System/Segment Specification, when provided. Its other major

interface points will normally be either the Remote Control Interface Unit described in FAA-E-2663, Interface Unit MALSR Remote Control, or the runway edge lights. The REIL will also interface with the TCCC (where installed). The control of REIL systems is defined, and in accordance with Order 6850.2A.

a. Remote Maintenance Monitoring System. Interfacing of the LCU with the RMS units and the MPS is normally accomplished via the built-in modems and the government furnished radio links. The LCU normally uses a UHF radio operating in the 406 to 420 MHz band. Other interface criteria are described below.

(1) The MPS interface is designed in accordance with EIA Standard RS-232 wired as a synchronous data terminal equipment (DTE), duplex, type D interface. The MPS interface is wired to a rear mounted female MIL-C-24308 (MS 18275) connector. The data rate across the MPS interface shall be 2400 bytes per second (bps).

(2) The LCU and the RMS terminal interfaces are both designed in accordance with EIA Standard RS-232, wired as asynchronous data interfaces, use even parity, and automatically adjust to the following baud rates: 110, 150, 300, 1200, 2400, 4800, and 9600. The terminal interface is wired to a front panel mounted female connector, MS18725, in accordance with MIL-C-24308. ASCII characters received via the terminal interface shall also be transmitted, i.e., echoed, as the characters are received.

(3) Normally the data interface between the LCU and the each equipment RMS is a half-duplex, 2400 bps, multi-point data radio link. However, provision to operate via a point-to-point, half-duplex, two-wire phone line is also available by means of wirestrapping. Minimum phone line quality in this configuration shall be 3002, (AT&T Tariff FCC-260) conditioned C-2 per Bell System Technical Reference Publication 41004 or equivalent. Since AT&T Tariff FCC-260 has been replaced by AT&T Tariff 9,10,11, the current line equivalent is channel type 5 conditioned C-2 with protocol type NO of AT&T Publication 43202. The line may be unconditioned (basic) if the modems can still transmit 2400 bps at an acceptable bit error rate. FAA Order 6000.22, Maintenance of Two-Point Private Lines, is scheduled to be updated to provide guidelines for required line characteristics to remove the dependence on the AT&T standard.

(4) In addition to the interface characteristics just mentioned, the LCU will also be capable of interfacing with the RMS in accordance with EIA Standard RS-232 wired as a synchronous, DTE, duplex, type D interface. The DTE interface

shall have the capability to utilize an external modem meeting the requirements of FED-STD-1005 (except paragraphs 2.2 and 2.4 and associated subparagraphs) to accomplish this function. Data rates across the DTE interface shall be programmable to 2400, 4800, 9600, and 19,200 bps.

b. Remote Control Interface Unit. The remote control interface unit provides the REIL system with connectivity to two external remote control systems. One of these, the RRCS described in FAA-E-2723, provides control of the REIL system to an operator in the ATCT. The other, described in AC 150/5345-49A, Specification L-854, Radio Control Equipment, provides control of the REIL system at an unattended facility to the pilot via an A/G receiver. The remote control interface unit is not provided with the REIL system and must be purchased separately if required.

c. Runway Edge Lights. When operating off the runway edge light circuitry, the REIL system interfaces with the runway edge lights via either a 100 watt, 6.6/6.6 Ampere, or a 200 watt 20/6.6 Ampere, 5 kiloVolt isolation transformer (in accordance with AC 150/5345-47). The isolation transformer is not provided with the REIL system and must be purchased separately if required.

d. Tower Control Computer Complex. The TCCC provides control instructions to the REIL which permit the controller to turn the equipment on or off. The lighting status display will show the on or off status entered by the controller.

34.-39. RESERVED.

CHAPTER 4. PROJECT SCHEDULE AND STATUS

40. PROJECT SCHEDULES AND GENERAL STATUS. The procurement of the REIL with RMS equipment is divided by fiscal year. The FY87/88 contract, DTFA01-88-Y-01049, is a design/production contract which will provide 95 REIL systems for delivery to the depot.

41. MILESTONE SUMMARY SCHEDULE. The current project schedule is shown in Table 4-1, REIL With RMS Schedule. Project events are scheduled in relationship to the date of contract award. The dates listed are for those milestones completed or anticipated. This table is by no means an all inclusive list of project milestones necessary for project completion.

ACTIVITY/MILESTONE	CURRENT STATUS or ESTIMATED DATE START	FINISH
Critical Design Review (CDR)	06/06/89	06/30/89
Initiate Deployment Readiness Review (DRR) Process	06/20/89	
DRR Briefing	06/01/90	------
Master Test Plan (MTP) Approval	11/20/89	02/12/90
Site Spares Delivered to Depot	12/22/89	
System Delivered to T&E Site	12/22/89	
Integration & Shakedown Tests Completed	02/13/90	03/19/90
Project Implementation Plan	08/29/89	01/31/90
First System Delivered To Depot	06/29/90	
Implementation of Projects	09/28/90	01/31/92
Last System Delivered to Depot		12/11/90

TABLE 4-1. REIL WITH RMS SCHEDULE

42. INTERDEPENDENCIES AND SEQUENCE. The following projects were identified as having interdependencies with the REIL with RMS project. Because of the broad variation in site requirements, discussion of specific effects of each program on a site-by-site basis is beyond the scope of this PIP.

a. The Airport Cable Loop Program. The Airport Cable Loop Program establishes a network with all of the airport's power and control cables. The REIL with RMS will precede the Airport Cable Loop Program at some locations which might lead to their being dropped from control cable loops, although power cable loops may still be required.

b. The Airport Telecommunications Program. The Airport Telecommunications Program will establish the specifications and criteria for a reliable and flexible distribution system for low activity and medium activity airports. The Airport Telecommunications Program is related to all airport projects which require buried cable for control signals or communications between sites. The Airport Telecommunications Program investigates frequency interference and alternative communications media within the NAS plan. The REIL with RMS impacts this program only in the Landing area since the REIL with RMS does require some buried cable for the system to function.

c. The Remote Maintenance Monitoring System. The RMMS program has been developed to provide maintenance monitoring and control equipment for FAA facilities so that performance monitoring, certification, and control could be accomplished from centralized work centers. In some cases the RMMS program may not be fully implemented until some time after installation of the REIL with RMS has been completed. In these situations, the reduction in the frequency of on site maintenance visits derived from the integration of the REIL RMS with the RMMS may not be realized until some time after the REIL system has been installed. The RMMS program will have to be considered on a case-by-case basis for each airport affected.

43.-49. RESERVED.

CHAPTER 5. PROJECT MANAGEMENT

50. PROJECT MANAGEMENT, GENERAL. This section describes the organizations within the Program Engineering Service (APS) that are directly responsible for REIL program management.

a. Program Engineering Service. The Program Engineering Service manages, directs, and executes the FAA's engineering and management activities related to facilities design, air navigation, landing aids, and air traffic control facilities and equipment to ensure that the NAS is efficient, economical and responsive to operational needs. The management is matrixed and conducted within the frame work of the National Airspace Integrated Logistic Support (NAILS) Management Team (NAILSMT).

b. Navigation/Landing and Facility Monitoring Division (APS-400). This division is the principal element of the service responsible for the design, development, and implementation of systems, programs and facilities requirements for navigation and landing systems. Acts as chairman of the NAILSMT.

c. Approach Lighting and Visual Range Program (APS-450). The Approach Lighting and Visual Range Branch is the principal element of the division responsible for design, development, and implementation responsibilities for and visual aids.

d. Runway End Identifier Lighting System Program. The REIL program manager is supported by engineering personnel and is responsible for managing the design, development, and implementation activities associated with the runway end identifier lighting system. The program manager's duties include:

(1) Management. Planning, scheduling and managing the program from design through commissioning, logistics support, training, and program completion. Responsible for systems engineering, system design, man-machine interface, component design and related functional, technical, and performance characteristics.

(2) Logistics Support. Provides, in conjunction with the NAILSMT, technical guidance to define logistics support requirements for proper management and support of the REIL with RMS.

(3) Modernization Input. Developing service input for the modernization or in-service improvement of equipment.

(4) Technical Officer. Providing engineering advice and consultation to contracting officer during procurement, serving as technical officer, and reviewing contractor requests and progress payments.

(5) Cost Data. Developing and providing cost data, controlling assigned funds, and adjusting program schedules and objectives as necessary.

(6) Technical Installation Instructions. Preparing technical installation instructions.

(7) Maintenance Instructions. Preparing maintenance instructions, identifying training, provisioning and test requirements, and directing the preparation of maintenance technical handbooks.

(8) Testing. Reviews and approves the manufacturer's equipment test procedures. Establishes requirements and approves plans for test and evaluation of REIL with RMS at the FAA Technical Center.

(9) Inventory. Manages in transit material for construction and installation. Maintains currency of material systems and control over equipment inventory.

(10) Installation. Management of installation activities for current and future systems to assure a high level of system performance.

(11) Acceptance. Providing research, engineering, development, design and systems analyses associated with acquisition and acceptance of hardware and software.

51. PROJECT CONTACTS. This paragraph lists REIL project contacts and their addresses.

a. Cluster Manager. Rod Gill, APS-400, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, FTS 267-3595, (202) 267-3595.

b. Program Manager. Manager, APS-450, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C. 20591, FTS 267-7507, (202) 267-8498.

c. Project Engineer. Arthur Prigal, APS-450, Federal Aviation Administration, 800 Independence Avenue, S.W., Washington, D.C., 20591, FTS 267-8498, (202) 267-8498.

52. PROJECT COORDINATION. The REIL with RMS project requires coordination with other services within the FAA, with regional representatives and with the contractor on site representative during installation. Coordination by and with the organizations below is essential for them to efficiently accomplish their functions.

a. Maintenance Engineering Division (ASM-100). ASM-100 reviews procurement specifications to ensure the design meets the reliability and maintainability requirements and supports the general maintenance philosophy. ASM-100 also coordinates the development of an integrated logistic support plan for the REIL with RMS acquisition and develops maintenance standards and plans for implementation of maintenance concepts.

b. Maintenance Operations Division (ASM-200). ASM-200 participates in the development and review of maintenance plans. In addition, ASM-200 develops national Airways Facilities sector staffing standards for the REIL program and validates maintenance staffing requirements. The program manager ensures the project is in conformance with staffing, training, certification policies, guidelines and requirements.

c. Spectrum Engineering Division (ASM-500). ASM-500 obtains frequency authorizations necessary to satisfy the requirements of the National Airspace System. This division also provides engineering support to regional and field facilities in the resolution and prevention of radio frequency interference to NAS facilities.

d. Material Management Division (ALG-200). ALG-200 develops, recommends, and issues agency systems, procedures, standards, and policies, for material supply and property management. This division also develops the required logistics policies,plans and standards required to support the NAILS process.

e. Contracts Division (ALG-300). ALG-300 performs cost/price analyses of contractor's proposals and participates as a member of the Source Evaluation Board on REIL with RMS procurements subject to the contracting officer. In addition, ALG-300 provides procurement support for the REIL programs and plans, and places, and administers contracts for the REIL with RMS equipment. ALG-300 also designates a contracting officer (CO) who is responsible for all contractual matters. The CO is the only individual authorized to approve contract changes impacting price, delivery or schedule.

f. Industrial Division (ALG-400). ALG-400 performs factory inspection of the REIL with RMS. ALG-400 assigns a quality reliability officer (QRO) at the time the contract is awarded. The QRO is the FAA's representative at the contractor's facility and is responsible for verifying quality control. The QRO is directed by FAA policy and procedure, and by the terms and conditions of the contract.

g. FAA Depot (AAC-400). AAC-400 accepts deliveries of REIL systems from the manufacturer and manages the dissemination of REIL systems at the regions request. AAC-400 is responsible for logistics support.

h. FAA Academy (AAC-900). AAC-900 provides maintenance training and coordinates with ASM-260 in the development of a training plan.

i. Technical Training Division (AHT-400). AHT-400 analyzes training proposals prepared by ASM-200 and initiates action to meet training requirements.

j. FAA Aviation Standards National Field Office. The FAA Aviation Standards National Field Office is responsible for providing the coordination to accomplish their following functions:

(1) Determining if the operational status of a facility or system is in accordance with the established tolerances.

(2) Certifying the facility or system for operational use in the NAS when all operational requirements have been met.

(3) When applicable, ensuring that required Notices to Airmen (NOTAMS) are issued for any facility or system restriction.

k. FAA Regional Offices. The FAA regional offices, through established administrative structures, coordinate with all responsible parties to assure adequate funding, establish system commissioning/service availability dates, assign project field representatives and determine utility availability for the REIL system. The regions also provide field engineering as required to support preparations for the installation of REIL with RMS equipment and the installation of RRCS equipment to monitor/control the visual aids; order Government Furnished Materials (GFM) for tools and test instruments to support REIL with RMS installation and acceptance; tailor installation drawings to be site specific; initiate work orders and travel

authorization; and assign field personnel. If A/G radio control equipment is required, the region will purchase the unit. The following regional offices are responsible for the coordination required to accomplish the functions listed below:

(1) Regional Airway Facilities (AF) Division.

(a) Installing facilities systems and equipment in accordance with established standards, specifications and instructions.

(b) Notifying the appropriate sector that a project has been funded and issuing a projected implementation schedule.

(c) Providing the sector an opportunity to review and participate in project plans during the engineering phase and for furnishing the sector a copy of the engineering plans and contract documents.

(d) Providing the sector a copy of the project work order at least 10 days before the start of project work.

(e) Providing the appropriate facility reference data file (FRDF) information to the sector for inclusion in the FRDF. These data requirements will be established by the National Engineering Field Support Division, ASM-600 as part of shakedown test & evaluation (ST&E).

(f) Providing the essential facility, system, and equipment technical reference and performance parameters as part of the project transmittal when maintenance technical handbook parameters are not available.

(g) Ensuring that all modifications, Configuration Control Documents (CCD), manufacturer's field changes, and factory changes are current and documented for equipment received from sources outside the Airway Facilities sector.

(h) Notifying the joint acceptance inspection (JAI) board chairman of when the facility will be ready for JAI, providing the sector all data necessary to prepare warranty failure reports on items failing prior to JAI, and providing regional Airway Facilities division representatives for participation in the JAI.

(i) Establishing and maintaining a follow-up file for monitoring and clearing all JAI report exceptions, reviewing all JAI reports and follow-up reports for correctness, completeness

and proper distribution, taking appropriate and timely actions to clear JAI report exceptions, and identifying additional sources of funds or initiating budgetary action, as necessary, to clear exceptions.

(2) Airway Facilities Sector.

(a) Reviewing contract documents and engineering plans during the engineering phase and providing comments to the regional Airway Facilities division.

(b) Providing personnel as required at appropriate times throughout the project to witness and/or participate in construction, installation, tune-up, tests, and collection of technical reference data.

(c) Coordinating the release of equipment currently in use to regional Airway Facilities division establishment personnel for use in the project.

(d) Properly maintaining those components of an existing facility which are unaffected by an improvement project.

(e) Ensuring that modification/CCDs and documentation are current on installed equipment for the purpose for which the equipment was being used prior to the project.

(f) Providing a representative to serve as the joint acceptance board chairperson and other qualified personnel for participation in the JAI, preparing and distributing the JAI report, and assuming maintenance responsibilities and custodianship for facilities, systems, or equipment at the conclusion of JAI.

(g) Coordination and follow-up on exceptions after the JAI to include exceptions assigned to other organizations or to a contractor for clearance, clearing exceptions which have been assigned to the sector, reporting the clearance of exceptions, and reviewing all waived exceptions to determine if actions will impact sector operations or other organizations.

(h) Maintaining all equipment warranty information and reporting equipment failing under warranty.

(i) Receiving, storing, and shipping project materials and disposing of excess equipment and materials.

(3) Regional Logistics Division. Providing representatives to participate in specific projects which the regional Airway Facilities division has identified as having major logistical problems and has requested the participation by the regional Logistics division.

l. The REIL contractor, when requested by APS-450, provides engineering support services for on site advice, including technical supervision to FAA technicians and the installation contractor concerning proper installation or operation of REIL with RMS.

m. The Software and Program Support Branch, APS-410 has the responsibility to develop a REIL RMS Interim Monitor and Control Software (IMCS) module.

53. PROJECT RESPONSIBILITY MATRIX. Figures 5-1, Project Responsibility Matrix, illustrates the FAA organizations responsible for the implementation of each significant function of the REIL with RMS project.

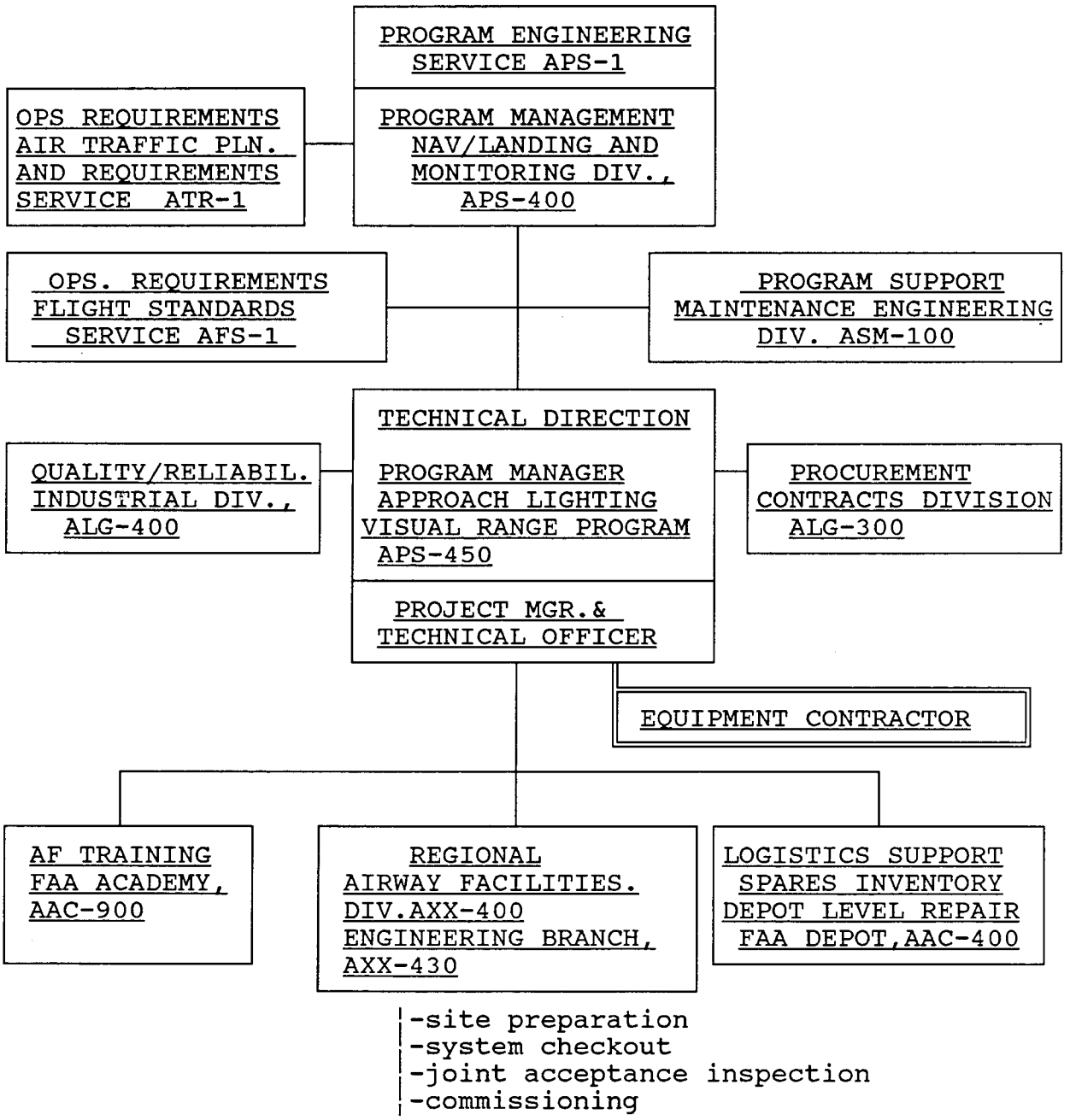

FIGURE 5-1. PROJECT RESPONSIBILITY MATRIX

54. PROJECT MANAGERIAL COMMUNICATIONS. The REIL program manager within APS-450 is the focal point for all internal project communication. Organizations supporting the REIL program designate a representative to maintain close communication with the Approach Landing and Visual Range Program Office. Supporting organizations maintain communications with both the contractor and internally within the FAA. The meetings listed below are the regularly scheduled project meetings.

a. The National Airspace Integrated Logistics Support Management Team Meeting. These meetings are held to ensure that there is an interrelated, unified and iterative approach to the managerial and technical activities which support the National Airspace System. During these meetings, issues effecting logistics management, maintenance planning, supply support, test and support equipment, manpower and training support, support facilities, technical data, and packing, handling, storage and transportation are discussed and resolved. These meetings are held on a semiannual basis at the FAA headquarters.

b. Program/Project Status Review Board Meetings. These board meetings are held on a monthly basis at the FAA headquarters to discuss project status and to resolve problems and issues effecting all phases of the project from the time that the requirements are established until system deployment has been completed.

55. IMPLEMENTATION STAFFING. There are no personnel requirements peculiar to the implementation phase of the project.

56. PLANNING AND REPORTS. None required.

57. APPLICABLE DOCUMENTS. Within this PIP the following documents have been referenced.

a. AC 150/5345-49A, Specification L-854, Radio Control Equipment, August 8, 1986.

b. Contract DTFA01-88-Y-01049, for Runway End Identifier Lighting System with Remote Monitoring Subsystem, June 9, 1988.

c. FAA-E-2663, Interface Unit MALSR Remote Control, November 18, 1976.

d. FAA-E-2723, Remote Radio Control System, December 21, 1982.

e. FAA-E-2159d, Runway End Identifier Lighting System (REIL) with Remote Monitoring Subsystem (RMS), August 18, 1987.

f. FAA-E-2782, Remote Maintenance Monitoring System, Core System/Segment Specification, July 14, 1986.

g. FAA-G-2100e, Electronic Equipment, General Requirements, March 11, 1987.

h. FAA Order 1800.8E, NAS Configuration Management, July 11, 1985.

i. FAA Order 1810.4A, ADL Test and Evaluation Program, February 14, 1989.

j. FAA Order 6000.22, Maintenance of Two-Point Private Lines, August 1976.

k. FAA Order 6000.26A, Reliability and Maintainability Policy, May 14, 1982.

l. FAA Order 6030.45, Facility Reference Data File, March 28, 1974.

m. FAA Order 6850.2A, Visual Guidance Lighting Systems, December 17, 1981.

n. FAA Order 6950.2C, Electrical Power Policy Implementation National Airspace System Facilities, November 1987.

o. NAS-DD-1000B, Level I Design Document, May 1986.

p. NAS-MD-110, Test and Evaluation (T&E) Terms and Definitions for the National Airspace System, March 27, 1987.

58.-59. RESERVED.

CHAPTER 6. PROJECT FUNDING

60. PROJECT FUNDING STATUS, GENERAL. Project funding for the REIL has been provided for FY83 through FY88. The current contract, which was awarded on June 9, 1988, is for 60 REIL systems. Outyear requirements will be determined by the urgency of the requirement and the availability of funds.

61.-69. RESERVED.

CHAPTER 7. DEPLOYMENT

70. GENERAL DEPLOYMENT ASPECTS. Deployment of REIL systems is conducted by the FAA Depot at the Mike Monroney Aeronautical Center and the FAA regions. As regional funds become available, requests from the regions to satisfy airport requirements are honored by the FAA Depot. REIL with RMS equipment is shipped by the FAA Depot to the site where it is stored for installation. Installation of the equipment is the responsibility of the region. Table 7-1, REIL With RMS (FY 87/88) DRR Schedule depicts the REIL with RMS Deployment DRR Schedule.

Event	Date
DRR Process Initiated	20 Jun 89
DRR Briefing Scheduled	01 Jun 90
First Delivery to Depot	29 Jun 90

TABLE 7-1. REIL WITH RMS (FY 87/88) DRR SCHEDULE

71. SITE PREPARATION. The regions are responsible for preparing the sites where REIL equipment will be installed. Site preparation includes planning for installation and integration with the remote radio control system at both the tower and at the runway location. Considerations for site preparation include weather conditions and concurrent construction activities. The system manager at each MPS shall pre-assign a bit synchronous port for each REIL link control unit RMS to be monitored. This should be carefully coordinated with APS-410 to ensure that a port/ports will be available at the time of REIL installation.

72. DELIVERY. The first REIL with RMS will be delivered to the test & evaluation field site on December 22, 1989. REIL with RMS equipment will be available to the regions under the constraints of fiscal year funding. The depot ships equipment to the regions as requests are made and in accordance with the quantities called out in the project status report (PSR). Deliveries to the depot are scheduled to continue until December 11, 1990. System for the FAA Academy is scheduled for May 15, 1990. Implementation of the project is scheduled to be completed in January of 1992.

73. INSTALLATION PLAN. The FAA regions shall coordinate the receipt, installation and evaluation of all equipment required to form the REIL with RMS. The REIL with RMS shall be installed in accordance with national standard drawings and standards revised to fit the individual site. The regional office shall coordinate the complete installation, alignment, and operational tests on all identified REIL with RMS interfaces to assure full compliance with FAA specifications and performance. The Contractor shall provide engineering support services for on site advice, including technical supervision to FAA technicians and the installation contractors concerning the proper interfacing of the A/G receiver, RRCS, TCCC, RMMS, and runway edge lights to the REIL with RMS when required. Performance analysis and evaluation reports shall be forwarded to the FAA regional office for acceptance.

74. CONFIGURATION MANAGEMENT PLAN. Configuration Management (CM) is the process used to identify and document the functional and physical characteristics of a configuration item, control changes to those characteristics, and record and report change processing and implementation status. Configuration items of concern for this implementation are the Identifier Assemblies, Aiming Instrument, Control Cabinet, LCU, and the RMS Interface baseline. The configuration management discipline shall be applied to all configuration items included in the REIL with RMS baseline to ensure compatibility between elements within the REIL with RMS. All additions and changes to the REIL with RMS baseline shall be proposed in the form of a case file, and shall be reviewed for recommended approval or disapproval by a Configuration Control Board (CCB). All changes to the NAS site design baseline, the Identifier Assemblies, Control Cabinet, LCU, and the RMS Interface must be processed and approved by the Navigation/ Landing and Facilities Monitoring Division (APS-400) Cluster CCB.

a. Acquisition Phase Configuration Management. The APS-400 Cluster CCB controls the establishment of and changes to the REIL with RMS hardware baseline during the acquisition phase. For REIL with RMS matters, the APS-400 CCB will include members from ASM-600; Spectrum Engineering Division,ASM-500; Nas Planning & Program Management Division,ASE-100; System Engineering Branch, ASE-210; ACT-100, AFS-200 and the Configuration Management Division, ASE-220, as defined by the APS-400 CCB charter and operating procedure. The APS-400 CCB is responsible for ensuring that the functional, performance, and interface requirements allocated to the REIL with RMS hardware subsystems are reflected in the baseline, and in any changes to those baseline until product acceptance. The APS-400 CCB is also

responsible for ensuring that baseline documentation is accurate and reflects REIL with RMS operational requirements. Baseline documentation includes specifications and interface control documents (ICDs). Note, that the ICD for the REIL was prepared for the LCU to MPS under the ILS airport remote monitoring system (ARMS). The APS-400 CCB retains this CM responsibility throughout the REIL life cycle.

(1) The transition of configuration management responsibilities associated with REIL with RMS hardware products occurs at acceptance by the APS-400 CCB designated representative of the contractor's delivered, installed, integrated, and tested hardware product. Hardware product acceptance is based on successful operational readiness demonstration (ORD) of the complete REIL system.

(2) At product acceptance, the change control functions and CCB records associated with hardware products that effect Level III drawings and instruction books transition from the APS-400 CCB to the ASM-100 CCB.

b. Operational Support Phase Configuration Management.

(1) During the operational support phase, and for the entire life-cycle of the implemented hardware enhancements, configuration management functions will consist of maintenance and change control management of site as well as product baseline (Level III Design).

(2) The ASM-100 CCB assumes baseline and change control management of the Identifier Assemblies, Control Cabinet, LCU, and the RMS Interface hardware products and associated peripherals as each product is commissioned for operational service (via Memorandum of Agreement), and of related NAS site design baseline (including logistics and training). The ASM-100 CCB is responsible for change control management of the REIL with RMS hardware product baseline by Memorandum of Agreement. Hardware product baseline are maintained by ASM-600 personnel in the field. The contractor shall provide engineering changes to ASM-600 when the changes are released, and prior to field implementation. ASM-600 shall evaluate the changes and approve the change for field implementation via a case file. The configuration management functions assigned to the ASM-100 CCB are described in the ASM-100 CCB charter.

75.-79. RESERVED.

CHAPTER 8. VERIFICATION

80. FACTORY VERIFICATION. The contractor performs a series of tests in accordance with the requirements of the contract, the equipment specification, FAA-G-2100e, Electronic Equipment, General Requirements, and other documents prior to acceptance of the equipment by the FAA. Design qualification tests, type tests, and production tests will demonstrate that all hardware, software, and all performance requirements are met before the FAA accepts a REIL system from the contractor.

81. CHECKOUT. After installation of equipment by the regions, FAA personnel conduct checkout tests in accordance with the contractor developed equipment instruction books. The procedures followed include testing electrical and mechanical hardware interfaces, verifying system performance, testing interfaces through diagnostics, and verifying maintenance capability and adequacy of support hardware and software.

82. CONTRACTOR INTEGRATION TESTING. Not applicable.

83. CONTRACTOR ACCEPTANCE INSPECTION (CAI). Not applicable.

84. FAA INTEGRATION TESTING. These tests are conducted to verify that the REIL system has been integrated as specified and that it can interface with the specified external systems. Included are tests that verify the operation of multiple interfaces and integration with other systems in the operational environment. At this point in time, the REIL with RMS should have been adapted to parameters of the operational equipment with which it must interface.

85. SHAKEDOWN AND CHANGEOVER. System shakedown is the critical period of testing that is performed after the FAA takes full responsibility for equipment/systems and software. Evaluations to determine the adequacy and acceptability of procedures and operations to demonstrate an initial operating capability (IOC) shall be accomplished prior to system shakedown. During system shakedown, tests and checks are conducted on the automated system to verify that it functions properly, meets operational requirements, and is maintainable. System shakedown permits facility personnel to become familiar with the system, learn its limitations, and to become proficient in diagnosing problems and effecting repairs. Shakedown activities include accomplishment of the following activities:

a. Operational and maintenance proficiency and hands-on training.

b. Evaluations to determine the adequacy of system failure detection and recovery procedures.

c. Live testing of operational functions, including specific adaption data, and system configuration.

d. Evaluations to determine the suitability of displayed operational data.

e. ASM-600 shall establish facility reference file data requirements for commissioning.

86. JOINT ACCEPTANCE INSPECTION. A joint acceptance inspection is conducted in accordance with FAA Order 6030.45, Facility Reference Data File to gain the consensus of involved office that the REIL project has been completed in accordance with applicable standards and specifications and that the facilities are capable of providing the services required within established standards and tolerances. The JAI ensures compliance with requirements in the following areas:

a. Facility Construction and Equipment Installation.

b. Facility/System/Equipment Performance.

c. Facility Technical Performance Documentation and Maintenance Reference Data.

d. Facility Logistics Support.

e. Final Acceptance and Commissioning.

87.-89. RESERVED.

CHAPTER 9. INTEGRATED LOGISTICS SUPPORT

90. MAINTENANCE CONCEPT. The concept of maintenance for the REIL system shall consist of both site and depot repair. Maintenance Technicians (either FAA and/or contractor) will replace REIL and RMS components down to the line replaceable units (LRU) and may perform limited repair/corrective and preventative maintenance functions as required, on site. The FAA Depot will manage the repair, alignment, and calibration of REIL system when specialized equipment or procedures are required. Depot level repair will provide the capability of completely overhauling and rebuilding equipment as well as providing backup support in the form of complex repair actions that are beyond the resources of the work center. These functions can be performed by either the FAA and/or a commercial contractor.

91. TRAINING. The training program for the REIL Project is contained in the REIL Subsystem Training Plan. Assignment of training quotas for the regions will be made by ASM-260 for AF personnel. Projected training requirements by individual work centers/facilities and principal training milestones are included in this training plan. Initial training of FAA AF personnel will be conducted by the contractor at the contractor's facility. Training courses are developed and conducted for those technicians who perform maintenance on REIL systems and FAA Academy personnel who will be generating FAA Academy resident training courses. Training course graduates will be able to configure the REIL system for normal operation and system testing using manufacturers instructions and FAA Handbook Specifications. They will possess sufficient knowledge to troubleshoot and repair to LRU level and to perform and document all periodic maintenance.

92. SUPPORT TOOLS AND TEST EQUIPMENT. This section describes support and test equipment, including all common and special tools, as well as any connectors or other interface devices necessary to connect the support equipment to the end item or Unit Under Test (UUT). Test equipment is supported at the AF sector office having responsibility for the visual aid facility.

a. Common tools, test/support equipment, interface devices and connectors for maintenance of the REIL with RMS. The contractor provides a list of the common tools, test/support equipment, interface devices and connectors required for maintaining REIL with RMS equipment at all levels of maintenance.

b. Special tools, special test/support equipment and special interface devices for maintaining the REIL with RMS. Special tools, test/support equipment, and/or interface devices required to support the REIL with RMS will be held at a minimum. Special tools or test equipment required for initial adjustments (i.e. aiming instrument), testing, and/or maintenance of the REIL with RMS project are provided with the equipment.

93. SUPPLY SUPPORT. The FAA Depot is responsible for providing supply support to the REIL with RMS in the forms of maintaining inventory records and the master FAA catalog, and interfacing with the Federal Cataloging System.

94. VENDOR DATA AND TECHNICAL MANUALS. Instruction books for the REIL with RMS are provided by the contractor and reviewed by the FAA prior to acceptance. Instruction books are provided with each system that is delivered. Other documentation to be provided by the contractor include a reliability program plan, reliability predictions, a maintainability program plan, maintainability predictions, a configuration management plan, provisioning technical documentation, test procedures and forms, and a spare parts peculiar list.

95. EQUIPMENT REMOVAL. No equipment removal is required.

96. FACILITIES. Not applicable.

97. EQUIPMENT NOT FURNISHED. The following is a list of equipment that may be required but that is not furnished with a REIL with RMS.

a. Frangible couplings.

b. 2-inch (5.08 centimeter) electrical metallic tubing conduit.

c. Portable terminal for local control and monitoring of the airport RMS.

d. UHF radios for RMS and LCU radio links.

e. External modems for the LCU and the RMS DTE interfaces.

f. Padlocks.

g. 100-watt, 6.6/6.6 Ampere or 200-watt, 20.0/6.6 Ampere isolation transformers.

h. 6.6 Ampere or 20.0 Ampere power adapters for powering the REIL off the runway edge lights.

i. Junction box.

98. GENERAL LOGISTICS SUPPORT REQUIREMENTS. Logistics support is a fundamental requirement, beginning with the development of the maintenance/support concept from the REIL with RMS system life-cycle phases of requirements determination to operations and maintenance. The NAILS program for the REIL with RMS project is based on the requirements to support all operational sites, the FAA Academy, the FAA Depot, the National Airway Engineering Field Support Division, and the National Automation Engineering Field Support Division (ASM-400). The Integrated Logistics Support Plan (ILSP) provides details on the development of this maintenance/support concept.

99. RESERVED.